

The impact of context and promotion on consumer responses and preferences in out-of-stock situations

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THE IMPACT OF CONTEXT AND PROMOTION ON CONSUMER RESPONSES AND PREFERENCES IN OUT-OF-STOCK SITUATIONS¹

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ABSTRACT

In general, consumer preferences depend on the context of a decision situation. This paper highlights the context-dependence of substitution behavior in out-of-stock (OOS) situations and provides evidence for the relevance of promotion as essential driver of customers' OOS reactions. We demonstrate both theoretically and empirically how OOS-induced preference shifts can be explained and predicted using context and phantom theory. In a series of experiments, we show that consumers substitute in accordance to a negative similarity effect, which is reduced for stock-outs of promoted low-involvement FCMGs. If a similar substitute is offered at a reduced price, the effect is enforced. For dissimilar substitutes, we show the contrary. The empirical findings further suggest an augmented probability of purchase postponement and a significant smaller chance of brand switching for stock-outs of promotional products. Furthermore, our study emphasizes outlet switching as a so far uninvestigated OOS reaction and discusses implications for retailers and manufacturers.

KEYWORDS: *Out-of-Stock, Context Effects, Phantoms, Promotion, Preference Shifts*

JEL CLASSIFICATION: *M31, C12, C13, C81*

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1 INTRODUCTION

Out-of-Stock (OOS) is not only a prevalent problem in today's retailing practice but also of high relevance in online and service sectors such as airlines or hotels. With regard to stationary retailing, the European Optimal Shelf Availability (OSA) survey revealed an average OOS level of 7.1% and an augmented rate of 10% for items on promotion (ECR Europe and Roland Berger 2003). Customers encountering such OOS situations are forced to react. Potential behavioral responses include item switching, brand switching, store switching, as well as purchase postponement and cancellation (Emmelhainz, Stock, and Emmelhainz 1991; Sloot, Verhoef, and Franses 2005). Depending on the respective response, both retailers and manufacturers may face severe damages (Campo, Gijsbrechts, and Nisol 2000). In the short run, possible risks for the manufacturer comprise an unexpected cannibalization of its own product range or the loss of customers to competing brands. Conversely, if customers decide to look for the missing item in another store, the retailer faces major losses. In the long run, OOS situations represent a serious threat to brand and store loyalty (Karakaya 2000).

The focus of previous OOS research is twofold: Firstly, the studies have looked at the magnitude of the potential behavioral responses. The results, however, vary strongly from study to study (Emmelhainz et al. 1991; Peckham 1963; Sloot et al. 2005). Secondly, the studies have identified fundamental determinants of OOS responses. Typically, a classical choice approach (e.g., a multinomial logit model) is applied to relate certain product-specific, store-specific, consumer-specific and situation-specific variables and the potential OOS reactions (Campo et al. 2000; Hegenbart 2009; Sloot et al. 2005; Zinn and Liu 2001).

However, up to now, research on customer reactions to OOS has not explicitly regarded promotion as an influencing situational factor, although OOS particularly occurs for promoted items, and some recent publications have underlined that this domain requires further research (Hegenbart 2009; Sloot et al. 2005). Building on the empirical fact that customers adapt their

buying behavior to promotional activities (Blattberg, Eppen, and Lieberman 1981; Gupta 1988), they can be expected to be especially dissatisfied if their purchase plans are hindered by a stock-out of the respective promoted product. Therefore, we assume OOS responses to differ from the so far discussed reactions when the unavailable item is on promotion. Additionally, promotions are known to drive purchase decisions with regard to brand and product choice (Blattberg and Jeuland 1981). Therefore, they can also be expected to influence substitution decisions when a previously desired item is stocked out.

While the majority of studies have analyzed general reaction behavior in OOS situations, only little thought has so far been devoted to OOS-induced preference changes with regard to the remaining brands at the point of sale (Breugelmans, Campo, and Gijsbrechts 2006; Campo, Gijsbrechts, and Nisol 2003). Another problem is that recent studies have primarily regarded the OOS problem in the context of the classical decision theory. This is a common assumption; however, is it reasonable to assume that preferences remain stable if the preferred brand is not available? If customers face an OOS situation, they are confronted with an entirely new decision situation represented by an altered choice set. Therefore, we claim that preferences shift as the relative attractiveness of an option is built on different reference criteria to compare the alternatives (Sheng, Parker, and Nakamoto 2005).

In two studies, we use context theory (Huber, Payne, and Puto 1982; Simonson 1989; Tversky and Simonson 1993) and research on phantoms (Highhouse 1996; Pratkanis and Farquhar 1992) to explain and predict the preference shifts subsequent to an OOS in a theory-based way. Particularly, we focus on the effect of promotion to influence substitution decisions in OOS situations. The first study demonstrates that for the temporal unavailability of products, substitution patterns correspond to a *negative similarity effect (NSE)* (Tversky 1972) which is, however, reduced for stock-outs of low involvement FMCGs on promotion. In the second study, we show that the *NSE* is even enforced for promotions of similar

substitutes. Yet, the effect is ruled out by the simultaneous occurrence of an attraction effect when dissimilar substitutes are offered at a reduced price.

Overall, our paper contributes to marketing and retailing literature (1) by including promotion as an important driver of customers' reactions in OOS situations, (2) by employing context and phantom theory to explain OOS-induced preference shifts and (3) by investigating substitution behavior in different experimental settings and making it predictable for retailers and manufacturers.

The paper is organized as follows: The next section briefly reviews theoretical aspects of context-dependent preferences and research on phantoms, thus providing the conceptual framework to deduct hypotheses on the effect of context and promotion on customer reactions and substitution patterns in OOS situations. We then describe the methodology to collect individual choice data in a series of online experiments, present the applied data analysis and test the derived hypotheses. We conclude with a general discussion of results and indicate implications as well as limitations and directions for future research.

2 CONCEPTUAL FRAMEWORK

2.1 Preference formation in situations of varying choice sets

Recent studies on OOS reactions have predominantly applied the assumptions of classical economic theory (e.g., regularity and Independence of Irrelevant Alternatives (IIA) (Luce 1959)) and based their analyses upon criteria of rational choice. In contrast, extant research on consumer decision-making has revealed that consumers often do not have well-defined preferences and construct choice when required (Bettman 1979; Payne, Bettman, and Johnson

1992; Tversky, Sattath, and Slovic 1988). Accordingly, choices are dependent on the positions and the presence or absence of other alternatives (Bhargava, Kim, and Srivastava 2000; Huber et al. 1982; Simonson 1989).

Research on the context-dependence of choice has so far brought into focus the effects of new product introduction on customers' preference formation. Researchers have revealed that in these situations the assumed preference shifts according to the classic economic theory are violated. Preference relationships among the core alternatives are changed subject to the altered choice set if a new alternative is included. In general, the studies have employed the following experimental set-up (see figure 1): Subjects are initially confronted with a core set consisting of a target (T) and a competitor (C) in a two-dimensional space with approximately the same probability of choice. One core alternative is better on one dimension, whereas the counterpart is superior on the other dimension. Subsequently, a new option (S , D or E) is introduced adopting a specific position in the choice set and shifts in choice proportions are examined. In particular, it has been proven that by introducing a new option into the choice set (1) similar options lose proportionally more choice share than dissimilar ones (*similarity effect*, figure 1.1) (Tversky 1972), (2) dominating options can increase their choice share disproportionately (*attraction effect*, figure 1.2) (Huber et al. 1982) and (3) options that become a compromise between two alternatives are chosen above average (*compromise effect*, figure 1.3) (Simonson 1989). Our study focuses on one of the most accepted phenomena: the similarity effect which has been demonstrated by Tversky (1972) and Debreu (1960).

-- Insert figure 1 about here --

In contrast to the broadly covered research domain on new product introduction, the unavailability of items (e.g., OOS) and the resulting consequences for preference formation and choice have so far been paid less attention to in the literature. Yet, research on phantom alternatives offers a surplus knowledge to explain preference shifts in case of reduced choice sets. Here, a phantom alternative represents a choice option which looks real but for some reason is unavailable at the time a decision is made (Farquhar and Pratkanis 1993). Although phantom alternatives only represent illusory options which cannot be chosen, they elicit an influence on the preference structure of a decision maker. This is because individuals utilize the ‘irrelevant’ information of phantoms to evaluate the available alternatives (Farquhar and Pratkanis 1993). Phantom alternatives cause shifts in the preference structure which do not conform to the IIA assumption. Accordingly, a phantom alternative does not lead to a proportionate increase in the choice probabilities of the available alternatives but to disproportionate shifts in preference depending on different relative positions of the unavailable product.

With regard to those relative positions, literature on phantom alternatives has distinguished between asymmetrically dominating (Pettibone and Wedell 2007) and asymmetrically dominated phantoms (Fitzsimons 2000; Hedgcock, Rao, and Chen 2009), relatively inferior (Doyle et al. 1999) and relatively superior phantoms and phantoms that are dominated by or are dominating both T and C (Gierl and Eleftheriadou 2005). Despite the elaborate classification of phantoms, only few of these potential positions have so far been empirically tested. The majority of studies have analyzed the impact of asymmetrically dominating phantoms on preference formation proving a positive effect of R (range increasing)-phantoms on T 's choice probability in relation to C (Hedgcock et al. 2009; Highhouse 1996; Scarpi 2008). Possible explanations include loss aversion (Tversky and Kahnemann 1991), shifts in attribute importance (Hedgcock et al. 2009; Highhouse 1996), value shifts (Pettibone and

Wedell 2000) and the similarity substitution heuristic (Pettibone and Wedell 2000; Tversky 1972). Pettibone and Wedell (2007) further revealed that for asymmetrically dominating F (frequency increasing)- and RF (range frequency increasing)-phantoms the effect on T 's choice share is smaller than for range-increasing phantoms. Gierl and Eleftheriadou (2005) showed that asymmetrically dominating F - and RF -phantoms also lead to preference advantages of C in comparison to T .

The existing classification can be extended by adding phantom positions to the attribute space which are neither dominating nor dominated (i.e., they are located on the same trade-off-line as T and C). This way, the existence of the traditional context effects (similarity, attraction and compromise) in situations of unavailable choice options can be studied (Wiebach and Hildebrandt, 2011).

2.2 Hypotheses

Building on the results of previous OOS studies, the context-dependence of choice and phantom theory, we develop our system of hypotheses. The first part of our investigation focuses on the behavioral OOS responses and the influence of promotion. Particularly, we assume that consumers who are faced with an OOS for a promoted item will tend to leave the store and change to another outlet of the same retail chain to benefit from the promotional offer. We base this assumption on empirical findings which show that customers consciously switch between retailers to make their purchases in stores offering price promotion and featuring on certain articles (Fox and Hoch 2005). In contrast, the average of available empirical evidence on OOS responses suggests that 50% of OOS-affected customers are willing to substitute the missing item within the retail assortment. Accordingly, we expect customers who encounter a stock-out for a regular item to be more inclined to substitute, as

they are not missing a special offer and are less motivated to switch the retail outlet. The marketing literature has typically viewed promotional activities as a reason for customers to stockpile (Blattberg et al. 1981; van Heerde, Gupta, and Wittink 2003). That is, customers trade off inventory costs and product prices and consequently buy earlier and larger quantities of the promoted article than actually required. Since time of purchase and time of consumption do not necessarily correspond, it can be assumed that customers would rather defer a purchase for a product that is OOS if this purchase was only motivated by a promotional offer. Consequently, we assume:

- H1a:** In OOS situations of promoted items, customers change the outlet with higher probability than in OOS situations of non-promoted items.
- H1b:** In OOS situations of non-promoted items, customers show a higher probability to substitute than in OOS situations of promoted items.
- H1c:** In OOS situations of promoted items, customers postpone the purchase with higher probability than in OOS situations of non-promoted items.

The second part of our analysis addresses customers' substitution patterns and preference changes. In this research, we primarily test the similarity hypothesis for product exit – the *NSE*. We build on prior research on preference formation for product entry to generate the respective hypotheses for the reversed scenario of product exit. Based on the assumption that all available alternatives lie on the same trade-off line and hence neither option dominates the other (see figure 1.1), the similarity hypothesis for market entry asserts that a new alternative takes share disproportionately from more similar alternatives (Tversky 1972). Due to the addition of *S* to the choice set, *S* and *C* are perceived as exchangeable options and constitute one cluster in the consumer's mind (categorization process) (Cohen and Basu 1987; Tversky

1977). The loyalty of a potential buyer is divided by the similar items (Huber and Puto 1983). By contrast, the perceived distance with regard to the dissimilar option T is increased (Parducci 1965).

We propose for the inverse setting that in OOS situations the choice share of the similar and available item (T) will increase disproportionately, whereas the relative share of the dissimilar option (C) will decline when the preferred item (S) is OOS (see figure 2.1). This is because customers seek to simplify the decision process and minimize the risk of substitution by switching to similar alternatives (Breugelmans et al. 2006). In addition, the expected preference shift can be explained by the loss-aversion principle (Tversky and Simonson 1993). The assumption that losses loom larger than accordant gains (Kahnemann and Tversky 1979) predicts people to select the similar option. Besides, by choosing the similar option, the decision-maker with an initial preference for S obtains an item that is unambiguously superior to the unlike item on the obviously more important dimension. The postulated *NSE* results in a violation of the proportionality framework which underlies constant utility and independent random utility models of choice (Luce 1959; Mc Fadden 1980). Accordingly, we propose:

H2a: In OOS situations of non-promoted and non-dominating items the *NSE* occurs.

-- Insert figure 2 about here --

However, if the OOS alternative is on promotion, its relative position is altered due to changes in price. Let us assume that dimension one comprises the attribute price and the previously available alternative S_I illustrates a decision-maker's preferred item. Then, this preferred item is announced to be on promotion and OOS. Consequently, it is shifted in the

attribute space as illustrated in figure 2.2 and referred to as S_I^P . Since for S_I^P the value of dimension two (e.g., quality) stays unaffected and the value of dimension one (price) improves as the item gets cheaper, it is perceived superior to the similar and available option T on both dimensions and can be construed as an asymmetrically dominating *RF*-phantom (Pettibone and Wedell 2007). The dominated alternative T hence appears less attractive and its choice is harder to justify – findings supported by the dominance-heuristic (Highhouse 1996; Simonson 1989) and the loss-aversion principle of the relative advantage model (Tversky and Simonson 1993). That is why, we expect the decision-maker to be less inclined to choose the similar (and dominated) alternative than in the setting without promotion. Thus, we predict the increase in choice share of the similar option T to be smaller for the promotion setting. The *NSE* will consequently be alleviated.

The same holds true for another possible framing. If the initially preferred item S_2 is superior to the similar alternative T on dimension one (price) but inferior to T on dimension two (e.g., quality), the factor promotion leads to a shift in the attribute space as displayed in figure 2.3. The position of the unavailable item S_2^P is dubbed relatively superior by Gierl and Eleftheriadou (2005). So far, this phantom position has not been tested. As the similar alternative T is relatively inferior to the OOS option, it is considered less attractive and its selection is again harder to justify (Highhouse 1996; Simonson 1989). In addition, the perceived distance to the initially dissimilar option C is diminished (Parducci 1965). We conclude that the relative choice proportion of the similar alternative T will be reduced in comparison to the non-promotion setting. Accordingly, the postulated *NSE* is diminished. In total, hypothesis 2b states:

H2b: In OOS situations of promoted phantoms the *NSE* diminishes.

Additionally, scenarios are imaginable in which – instead of the preferred and unavailable option S – one of the remaining alternatives at the POS is offered on promotion (see figure 3).

-- Insert figure 3 about here --

Let us assume that the most similar substitute T is offered at a reduced price, resulting in a rightward shift in the attribute space. Consequently the stocked-out item S takes the position of a relatively inferior or an asymmetrically dominated phantom, as it either demonstrates a worse trade-off than T_1^P or is dominated by T_2^P on both attribute dimensions respectively (see figure 3.1 and figure 3.2). Assuming that the phantom S serves as the customer's reference point to evaluate the available options (Heath et al. 2000), T_1^P represents a large gain on dimension one by losing only little on dimension two, whereas by switching from S to T_2^P , customers receive a gain on both considered attributes. In both cases, however, switching from S to the competing option C implies a large gain on dimension one accompanied by a simultaneous large loss on dimension two. Due to loss aversion and prospect theory, C thus appears less attractive resulting in an augmented choice probability of T_1^P and T_2^P respectively (Hedgcock et al. 2009; Tversky and Kahneman 1991). Consequently, in both scenarios the choice probability of the most similar alternative T can be expected to increase disproportionately, resulting in a *NSE*. This effect can be expected to be even more pronounced than for the non-promotional setting (cf., hypothesis 2a), since a switch from S to T_1^P or from S to T_2^P implies a better gain-loss-ratio than a switch from S to T . Summing up, we suggest:

H3a: In OOS situations promotions of similar substitutes enforce the *NSE*.

In the same vein, we can imagine one dissimilar or even very dissimilar substitute to be on promotion at the time the preferred product is temporarily unavailable. Figure 4 depicts the case when either competitor C_1 or competitor C_2 is offered at a reduced price causing a rightward shift of the respective item in the attribute space.

-- Insert figure 4 about here --

If C_1 is on promotion, C_2 can be construed as an asymmetrically dominated decoy since it is dominated by C_1^P but not by any other alternative of the choice set (see figure 4.1) (Huber et al. 1982). Here, C_2 represents a decoy and not a phantom since it is a selectable option. If C_2 is on promotion, option C_1 takes the place of a relatively inferior decoy in relation to C_2^P as it exhibits a relatively worse trade-off on the considered attribute dimensions (see figure 4.2) (Huber and Puto 1983). Building on the fact that individuals use heuristics to facilitate decision making in new decision contexts (Bettmann 1979), customers in these situations can be expected to substitute the unavailable with the promoted item since the cost of making decisions between dominated pairs is smaller than between non-dominated ones (Huber et al. 1982; Shugan 1980). Thus, deciding between C_2 and C_1^P or C_1 and C_2^P is easier than between any of these options and T . That is why the choice probability of C_1^P and C_2^P can be assumed to increase disproportionately. This effect is known as the *attraction effect* (Huber et al. 1982) which can hence be assumed to offset or at least lower the *NSE* in the presented setting. Summing up, we hypothesize:

H3b: In OOS situations promotions of dissimilar substitutes offset the *NSE*.

3 STUDY 1

The primary purpose of study 1 was to contrast individuals' OOS responses and their respective substitution patterns for stock-outs of promoted versus non-promoted items. Owing to the fact that promotional activities influence customers' purchase behavior, we first tested the prediction that the behavioral reactions between both scenarios differed significantly (hypothesis 1a - hypothesis 1c). In the second part of the study, preference changes were considered and the existence of a *NSE* was examined for different product categories. Specifically, we wanted to demonstrate that choices of similar options are indeed more probable than switching to dissimilar alternatives (hypothesis 2a). Yet, this phenomenon should be reduced for stock-outs of promoted items (hypothesis 2b).

3.1 Participants and Design

Data on OOS responses and substitution behavior was collected by a series of online experiments comprising between 451 and 1210 respondents per study. The participants were primarily students at a large university who were addressed during courses or via a university-wide mailing list. Four products were tested: two low involvement FMCG categories (detergent and orange-juice) and two high involvement categories (restaurants and hotels). We employed a 4 (detergent vs. orange juice vs. restaurant vs. hotel) x 2 (OOS item on promotion vs. OOS item not on promotion) pretest-posttest control group design with randomized group assignment. While the control group (CG) faced a stock-out during an average shopping situation, the experimental group (EG) was confronted with an OOS situation of a promoted item.

3.2 Procedure and Stimuli

Initially, in each experiment, test persons were faced with four fictitious brands that differed in price and quality (see table 1). The four alternatives were constructed such that always two brands resembled each other and formed similar substitutes. Consequently, the choice sets consisted of two alternatives with a high quality-price combination and two alternatives with a rather low quality and low price. The four alternatives were non-dominating, that is, they were placed on the same trade-off line (see figure 5).

-- Insert table 1 about here --

-- Insert figure 5 about here --

To test the hypotheses about OOS reactions and substitution behavior, we applied a three (two) stage approach for the low involvement FMCG categories (for the high involvement categories): In the first choice situation, test persons were asked to select their favorite brand (nominal choice) and to indicate a preference ranking for all four alternatives on a constant sum scale (ratio data). In the second situation, participants were confronted with a reduced choice set and informed that the item, which they selected in the first choice situation, was OOS and thus not available. The experimental groups additionally received the information that their preferred product was on promotion but unfortunately already OOS. For detergent, the promotion package contained 10 additional loads, for orange juice and restaurants 20% discount were announced and in the hotel setting, the respective hotel was offered at a 15% discount. Due to the promotional reduction in price, the relative position of the OOS item changed. Consequently, in the experimental groups it took positions of asymmetrically dominating and relatively superior phantoms respectively (see appendix A).

Respondents who were assigned to the low involvement FMCG categories were then asked to state if they would react to the OOS situation by switching to one of the remaining brands, by leaving the store to buy their favorite brand in another shop of the same or a different retail chain or by postponing the purchase. Subsequently, they were again confronted with the reduced choice set and this time forced to substitute. Participants answering the questionnaire about the high involvement classes were directly requested to choose one of the remaining alternatives.

3.3 Results and Discussion

Manipulation Checks

To check the success of the randomized group assignment for each experiment, we compared the distribution of the preference products in the first decision task. The results showed that in all four categories the experimental and the control groups resembled each other with regard to the distribution of the preference product (see table 2). A chi-square test confirmed the independence of the preference product and the assignment to the experimental groups ($\chi^2_{\text{detergent}}(3) = 1.519, p > .10$; $\chi^2_{\text{orange juice}}(3) = 1.536, p > .10$; $\chi^2_{\text{restaurant}}(3) = 1.238, p > .10$; $\chi^2_{\text{hotel}}(3) = 5.140, p > .10$). Accordingly, a possible bias could be precluded.

-- Insert table 2 about here --

Additionally, we had to ensure that the allocated preference points for both the preference alternative as well as the respective similar substitute did not differ between the respective experimental and control groups. These points formed the basis to calculate the expected choice shares under the IIA assumption and should not be different in order to compare

differences in substitution patterns in the second choice task statistically. A one-way ANOVA conducted on the allocated points for the preferred brand in all four experiments affirmed this precondition ($p > .10$). Furthermore, the independence of the experimental group and the initial preference ranking for the similar substitute was supported ($M_{\text{detergent}}^{\text{CG}} = 18.97$, $M_{\text{detergent}}^{\text{EG}} = 17.32$, $p > .10$; $M_{\text{orange juice}}^{\text{CG}} = 17.15$, $M_{\text{orange juice}}^{\text{EG}} = 18.54$, $p > .10$; $M_{\text{restaurant}}^{\text{CG}} = 16.41$, $M_{\text{restaurant}}^{\text{EG}} = 17.00$, $p > .10$; $M_{\text{hotel}}^{\text{CG}} = 17.16$, $M_{\text{hotel}}^{\text{EG}} = 16.77$, $p > .10$).

Behavioral reaction patterns

We first compared the differences in behavioral reaction patterns of the experimental groups and the respective control groups for each of the low involvement categories. A chi-square test of the nominal decisions was performed. The highly significant results for both categories ($\chi^2_{\text{detergent}}(3) = 23.729$, $p < .01$ and $\chi^2_{\text{orange juice}}(3) = 12.144$, $p < .01$) confirmed that responses to OOS situations differ considerably between promoted and non-promoted items. In comparison to the experimental groups, significantly more test persons of the control groups reacted by substitution. At the same time, a disproportionate number of test persons in the experimental groups decided to switch the outlet or to postpone the purchase.

The results of a one-way ANOVA conducted on the preference ratings for each reaction supported the result that participants of the promotion scenario distributed significantly less points to substitution than their non-promotional counterparts ($M_{\text{detergent}}^{\text{CG}} = 56.47$, $M_{\text{detergent}}^{\text{EG}} = 43.89$, $p < .01$; $M_{\text{orange juice}}^{\text{CG}} = 64.35$, $M_{\text{orange juice}}^{\text{EG}} = 59.54$, $p < .10$). Concurrently, those respondents allocated significantly more points to the reaction outlet switching ($M_{\text{detergent}}^{\text{CG}} = 7.13$, $M_{\text{detergent}}^{\text{EG}} = 13.32$, $p < .01$; $M_{\text{orange juice}}^{\text{CG}} = 5.56$, $M_{\text{orange juice}}^{\text{EG}} = 7.40$, $p < .10$) and tended to postpone the purchase ($M_{\text{detergent}}^{\text{CG}} = 28.33$, $M_{\text{detergent}}^{\text{EG}} = 35.54$, $p < .01$;

$M_{\text{orange juice}}^{\text{CG}} = 23.84$, $M_{\text{orange juice}}^{\text{EG}} = 26.50$, $p > .10$). Hence, hypotheses 1a–1b are supported, hypothesis 1c is partly confirmed.

These outcomes indicate that the factor promotion exhibits a strong influence on behavioral reaction patterns in OOS situations. When faced with a stock-out for a non-promoted item, customers show a higher probability to substitute and a lower probability to switch the outlet and to postpone the purchase than in the promotion scenario. This finding demonstrates that customers undertake considerable efforts to take advantage of promotional offers. In addition, outlet switching proves to be an important OOS reaction which has so far been missing in the OOS literature.

Substitution patterns

To account for the existence of context-induced preference shifts and particularly, the occurrence of a *NSE*, the principle of IIA had to be disproved and significant differences between the observed and the expected choice shares needed to be demonstrated. For that reason, a paired sample t-test was conducted to compare the expected choice shares of the similar substitute (*SS*) under the Luce model ($E_L(SS)$) (for calculations see appendix B) to the respective observed choice shares ($O(SS)$). Table 3 illustrates that in each experiment and category the mean value of the expected choice shares for the similar substitute lies significantly below the respective observed shares ($M_{\text{detergent}}^{O(SS)} = 54.09$, $M_{\text{detergent}}^{E_L(SS)} = 45.43$, $p < .01$; $M_{\text{orange juice}}^{O(SS)} = 73.83$, $M_{\text{orange juice}}^{E_L(SS)} = 58.29$, $p < .01$; $M_{\text{restaurant}}^{O(SS)} = 58.63$, $M_{\text{restaurant}}^{E_L(SS)} = 49.26$, $p < .01$; $M_{\text{hotel}}^{O(SS)} = 64.09$, $M_{\text{hotel}}^{E_L(SS)} = 52.22$, $p < .01$). As the *NSE* is said to occur whenever the observed choice share of the similar substitute exceeds its expected choice share ($NSE = O(SS) - E_L(SS) > 0$), the existence of the *NSE* was confirmed across categories. Hence, hypothesis 2a is accepted. The findings prove that preferences in OOS situations shift

contrarily to the assumptions of fixed preferences and proportionality. They instead change depending on the context.

-- Insert table 3 about here --

In the next step, the diminishment of the *NSE* for the experimental groups had to be shown. To test this prediction, the strength of the *NSE* was calculated for both the control and the experimental groups and compared by means of a one-way ANOVA (see table 3). For the low involvement FMCG categories, the mean of the *NSE* of the control groups lay significantly above the respective effect for the experimental groups ($NSE_{detergent}^{CG} = 11.09$, $NSE_{detergent}^{EG} = 6.26$, $p < .05$; $NSE_{orangejuice}^{CG} = 18.86$, $NSE_{orangejuice}^{EG} = 13.10$, $p < .01$). Consequently, hypothesis 2b is supported for this type of goods. By contrast, the outcomes revealed a different substitution behavior for the two high involvement goods: restaurants and hotels. Here, the proposed reduction of the *NSE* was not observable. The difference in the mean value of the *NSE* of both groups was not significant ($NSE_{restaurant}^{CG} = 10.40$, $NSE_{restaurant}^{EG} = 8.26$; $p > .10$, $NSE_{hotel}^{CG} = 10.97$, $NSE_{hotel}^{EG} = 12.51$, $p > .10$). Apparently, consumers of high involvement products tend to switch to similar products if their preferred alternative is temporarily unavailable, regardless of whether the initially preferred OOS item is announced to be on promotion or not. A possible explanation for this is the elevated perceived risk in purchase decisions for restaurant visits and hotels as those products are relatively costly and other people are affected by the decision outcome (Houston and Rothschild 1978). Since customers are known to engage in risk-reducing techniques to minimize the perceived risk in purchase situations (Dowling and Staelin 1994), they tend to switch to a very similar substitute when a formerly preferred high involvement product is unavailable. That way, the risk of making a wrong decision can be minimized. In contrast,

repeated purchase decisions for FMCGs are known to have a low involvement level and only bear a small risk of mispurchase (Hoyer 1984). Hence customers more easily switch to dissimilar substitutes to replace the unavailable item.

Summing up, it is shown that customers' substitution patterns in OOS situations are context-dependent and change subject to the relative positions of the phantom. Specifically, the findings demonstrate that preference shifts correspond to a strong *NSE* as long as the available alternatives do not obviously dominate each other. Yet, when the relative dominance structure is changed due to a promotion-induced alteration in price, customers are less inclined to choose the most similar substitute in FMCG low involvement categories. The probability of switching to the unlike alternative moves closer to the probability of switching to the similar alternative. Apparently, dominating options rupture decision heuristics leading customers to reconsider their habitual choices and switch to options which do not correspond to the formerly exhibited preference structure. However, in OOS situations of high involvement goods, customers tend to switch to the most similar substitute regardless of a promotional offer in an attempt to minimize the perceived risk of mispurchase.

4 STUDY 2

Study 2 was conducted to test our hypotheses 3a and 3b and extend the findings of study 1 in two important ways: First, we wanted to demonstrate that the *NSE* is existent and even enforced if a similar substitute is promoted. Second, the study should provide evidence for the proposed disappearance of the *NSE* if dissimilar substitutes are offered on promotion due to the simultaneous appearance of an attraction effect.

4.1 Participants and Design

In total, 1624 undergraduates of a large university participated in this online experiment in exchange for entry into a lottery with a prize of three Ipod shuffles. Two online questionnaires were distributed that only differed with regard to the analyzed product category (detergent and hotels). We applied a different experimental setting than in study 1, in which not the initially preferred and unavailable item was announced to be on promotion but one of the other still selectable alternatives. Consequently, three scenarios could be distinguished: the similar substitute (SS), the far substitute (FS) or the extreme substitute (ES) being on promotion. Participants were randomly assigned to one of the six conditions in a 2 (detergent vs. hotel) x 3 (SS vs. FS vs. ES) pretest-posttest design.

4.2 Procedure and Stimuli

The experiment used an analogous procedure to the first study, yet with a modification of the second choice task. Participants first made choices in four-item choice sets described with the two attributes quality and price (see table 1) and allocated preference points on a constant sum scale. Next, they were confronted with a reduced choice set in which the preferred alternative was again tagged OOS. Depending on the experimental condition, participants additionally were informed that the similar substitute, the far substitute or the extremely far substitute was on promotion. For detergent, the promotion package contained 10 additional loads, while in the hotel setting, the respective hotel was offered at a 15% discount.

In each experimental condition, the relative position of the respective promoted item changed in the attribute space. In contrast to the first study, the phantom position was not altered. However, the dominance structure of the remaining alternatives shifted subject to the

preferred item and the experimental condition (see appendix C). If the similar substitute was on promotion, the promoted alternative was either construed as asymmetrically dominating or a relatively superior item. Though, if one of the dissimilar options was offered at a reduced price, these options became superior to all remaining alternatives.

4.3 Results and Discussion

Manipulation Checks

To test the predictions about differences in substitution behavior, we needed to verify the independence of the experimental groups with regard to their initial preference structure. As required, the nominal choice in the first decision situation did not deviate among the three conditions in both categories ($\chi^2_{\text{detergent}}(6) = 2.922, p > .10$; $\chi^2_{\text{hotel}}(6) = 7.246, p > .10$, see table 4). A one-way ANOVA on the allocated preference points was performed and supported this notion ($p > .10$).

-- Insert table 4 about here --

In addition, the mean values of the distributed preference points for the similar alternative were comparable in five out of six scenarios. In the detergent category, each of the three groups did not deviate from each other with regard to the allocated points ($M_{\text{detergent}}^{\text{SS}} = 16.17$, $M_{\text{detergent}}^{\text{FS}} = 16.93$, $M_{\text{detergent}}^{\text{ES}} = 17.43, p > .10$). In the hotel category, however, a one-way ANOVA revealed that the mean values of the preference points distributed by the three groups differed ($M_{\text{hotel}}^{\text{SS}} = 18.31$, $M_{\text{hotel}}^{\text{FS}} = 18.30$, $M_{\text{hotel}}^{\text{ES}} = 21.13, p < .10$). A subsequent Duncan's test indicated that $M_{\text{hotel}}^{\text{SS}}$ and $M_{\text{hotel}}^{\text{FS}}$ resembled each other statistically whereas $M_{\text{hotel}}^{\text{ES}}$ differed significantly from both other groups ($M_{\text{hotel}}^{\text{SS}} = 18.31$, $M_{\text{hotel}}^{\text{FS}} = 18.30, p > .10$).

Substitution patterns

Table 5 summarizes the expected and the observed choice shares of the similar, far and extreme substitutes for the whole sample and the three subgroups (with the similar substitute, far substitute or extreme substitute on promotion) for both categories. Looking at the case when the similar substitute was on promotion, the results of the applied paired-sample t-test demonstrated that for both product groups the observed choice shares of the similar product lay significantly above the expected choice shares under the IIA assumption ($M_{\text{detergent}}^{\text{O(SS)}} = 69.86$, $M_{\text{detergent}}^{\text{E_L(SS)}} = 44.33$, $p < .01$; $M_{\text{hotel}}^{\text{O(SS)}} = 73.07$, $M_{\text{hotel}}^{\text{E_L(SS)}} = 50.41$, $p < .01$), pointing to a significant *NSE*. The descriptive comparison of the strength of the *NSE* between $SS_{\text{detergent}}$ and SS_{hotels} with the respective results $CG_{\text{detergent}}$ and CG_{hotels} of study 1 revealed that the *NSE* is substantially larger in situations when the respective similar substitute is on promotion than for non-promotional settings ($NSE_{\text{detergent}}^{\text{CG}} = 11.09$, $NSE_{\text{detergent}}^{\text{SS}} = 25.53$; $NSE_{\text{hotel}}^{\text{CG}} = 10.97$, $NSE_{\text{hotel}}^{\text{SS}} = 22.66$). Consequently, hypothesis 3a is confirmed.

-- Insert table 5 about here --

However, when either the far substitute or the extreme substitute was on promotion, the results indicated that the expected and the observed choice shares of the similar substitute did not differ or only differed marginally. Accordingly, no *NSE* ($NSE_{\text{detergent}}^{\text{FS}} = -2.34$, $p > .10$; $NSE_{\text{hotel}}^{\text{FS}} = 1.78$, $p > .10$; $NSE_{\text{hotel}}^{\text{ES}} = 2.01$, $p > .10$) or only a small *NSE* ($NSE_{\text{detergent}}^{\text{ES}} = 4.14$, $p < .05$) could be found, affirming hypothesis 3b. Looking at the choice shares of the promoted far and extreme brand, it became obvious that an attraction effect (*AE*) dominated the *NSE* as the promoted products gained choice share disproportionately while the respective dominated alternatives lost choice share above average. The *AE* was significant across

categories and throughout all scenarios ($AE_{\text{detergent}}^{\text{FS}} = 10.79, p < .01$; $AE_{\text{detergent}}^{\text{ES}} = 6.86, p < .01$; $AE_{\text{hotel}}^{\text{FS}} = 4.31, p < .01$; $AE_{\text{hotel}}^{\text{ES}} = 7.16, p < .01$), leading to the disappearance of the *NSE* and an approval of hypothesis 3b.

Study 2 gives further proof of the empirical fact that brand and product choices are driven by promotional offers (Blattberg and Jeuland 1981). The study, however, extends the findings to situations when the preferred item is temporarily unavailable and individuals are forced to choose a substitute out of the remaining alternatives. The results suggest that in OOS situations of the preference product, the promotion of a similar substitute enhances its choice probability, giving new evidence of preference shifts according to a *NSE*. If a dissimilar item is offered at a reduced price, this *NSE* is, however, offset by the simultaneous occurrence of an attraction effect which results from the altered dominance structure between the available substitutes. Consequently, the choice share of the similar substitute increases in accordance to the assumptions of classical economic theory, whereas the promoted product (which now holds a dominating position in the attribute space) can increase its choice share disproportionately.

5 DISCUSSION AND IMPLICATIONS

In summary, our analysis detects specific differences in OOS responses and substitution patterns for promoted and non-promoted items. As previous OOS studies have already shown, customers in OOS situations generally exhibit a high tendency to substitute unavailable items for other products within the assortment (Campo, Gijsbrechts, and Nisol 2004; Dadzie and Winston 2007; Verbeke, Farris, and Thurik 1998). However in our study, this response behavior turns out to be more clearly pronounced for customers in ‘average’ OOS situations.

Customers who encounter stock-outs for promoted items more frequently postpone their purchases or change to another outlet of the same retail chain to buy the promoted product. Those customers seem to behave both brand and store loyal, as they neither switch the brand nor the retailer but undertake considerable effort to get the preferred brand within the promotional offer.

Our research makes several key contributions to the marketing literature. Firstly, the results demonstrate the relevance of promotion as an essential driver for specific OOS reaction behavior. This is especially important as the OOS rates for promoted items are in general higher (ECR Europe and Roland Berger 2003). Since OOS research has so far neglected the influence of promotion, previous implications have to be adapted. Secondly, we extend OOS research by adding outlet switching as an additional reaction possibility. This reaction turns out to be a meaningful response, in particular for promoted OOS items. Thirdly, we successfully relate assumptions of context and phantom theory to OOS reactions by testing the similarity substitution hypothesis and proving the existence of the *NSE* contrary to the assumed preference shifts in classical economic theory. We further reveal and account for different magnitudes of this phenomenon. Thereby we supply a theoretical framework to OOS research.

5.1 Theoretical Implications

The current research extends the knowledge on OOS effects, context-induced preferences and phantom theory by uncovering a new explanation of OOS-induced preference shifts and including promotion as an important driver. The existing literature has largely focused on the behavioral responses in OOS situations incorporating substitution as an essential reaction. The present research contributes to the understanding of the substitution process. Our findings

suggest that OOS-induced preference shifts significantly deviate from the assumed preference shifts of classical decision theory. Specifically, we reveal that choice shifts depend on the relative position of the respective unavailable item. Study 1 illustrates that in ‘average’ OOS situations with non-dominating choice options, substitution patterns correspond to a *NSE* in that customers primarily choose substitutes which resemble the formerly chosen preference product based on the considered attributes. This behavior is robust for all covered product categories and can be interpreted as customers’ attempts to simplify the decision process and minimize the possible risk of mispurchase (Breugelmans et al. 2006). However, our results indicate that for stocked-out low involvement products on promotion, the *NSE* is diminished since customers significantly less often choose a similar substitute but consider the choice of an unlike product. Due to promotional price reductions, the dominance structure between the phantom and the remaining alternatives is altered. The promoted but unavailable item dominates the similar and available alternative, whereby it is perceived as being less attractive (Highhouse 1996; Simonson 1989). Consequently, its choice gets harder to justify. That is why consumers re-evaluate the available alternatives and more often opt for products which are not evidently dominated. However, for high involvement products, the diminishment of the *NSE* is not found. As deciding on high involvement products includes far-reaching consequences and a higher risk of mispurchase (Antil 1984), individuals prefer switching to the most similar option regardless of whether the favored option was on promotion. Another important point is considered in study 2: We extend literature by exploring the influence of promoted substitutes when preferred brands are OOS. Past research on the impact of sales promotion has largely revealed that the vast majority of sales increases are due to brand switching (van Heerde et al. 2003). Our results provide evidence that promotion of similar substitutes leads to an increased *NSE* in OOS situations as the similar substitute becomes a clearly dominating option. If instead a dissimilar alternative is offered at a reduced price, the

NSE is offset due to shifts in relative positions of the remaining options in the choice set. This outcome is in line with our prediction derived from extant literature on the context-dependence of choice. The promoted brand is asymmetrically dominating or relatively inferior to the other dissimilar alternative and, according to the well-established phenomenon of an attraction effect, increases its relative choice share disproportionately. Consequently, the *NSE* is inhibited in such scenarios.

Overall, our results suggest innovative ways for marketers to apply theory on context and phantom effects to explain and predict preference formation and choice behavior in situations of stock-out induced reductions of choice sets. It is restated that substitution decisions are context-dependent. As promotional offers change the decision context by altering the relative positions of the OOS item and the available alternatives, respectively, those offers significantly influence substitution decisions and can be used to direct individuals' preferences and choices in situations of unavailability.

5.2 Managerial Implications

The managerial implications of our findings are twofold. For the manufacturer, we find that OOS situations may imply severe damages since customers willingly decide to substitute within the remaining alternatives if the formerly preferred brand is temporarily unavailable. This way, the manufacturer not only loses margins in the short run but also bears the risk of losing possibly loyal customers to competing brands in the long run. Although a large part of OOS-affected customers decide to postpone the purchase, it remains unclear if those customers will return to the unavailable brand during their next shopping occasion. For stock-outs of promoted items, customers are less inclined to substitute and tend to follow the promoted brand into different outlets. However, this finding indicates that customers are

bargain hunters that only behave brand loyal when they expect financial compensation. Manufacturers have to question the value of those customers as they can be expected to easily switch to a competing brand if it happens to be on promotion. This behavior is actually demonstrated by the results of our second study.

For the retailer, on the other hand, our general results suggest fewer damages as the majority of OOS-affected customers decide to choose a substitute and only a small fraction switch the store. However, if the unavailable brand is offered on promotion, they significantly less often substitute within the retail chain and postpone their purchases with a higher probability. This behavior may result in lost margins for the retailer in the short run. By contrast, the newly introduced reaction ‘outlet switching’ proves to be especially relevant since a significantly higher proportion of customers in OOS situations for promoted items voluntarily visit another outlet of the same retail chain to profit from the promotional offer. This finding suggests that financial savings are a more relevant customer need than the disposability of products. With regard to substitution patterns, our results indicate that customers substitute in accordance to a *NSE*. This implies that retailers should always stock at least two similar products to facilitate substitution decisions in OOS situations. In addition, our findings evidence that retailers can guide brand and item choice in OOS situations by the systematic use of promotional activities. This, in turn, may offer an opportunity to strengthen their own private labels. As typically private labels are perceived to be very dissimilar to manufacturer brands with regard to the discussed dimensions quality and price (Bellizzi et al. 1981; Richardson, Dick, and Jain 1994), they should be offered on promotion if a manufacturer brand is OOS. Moreover, shops that only offer their own labels can re-direct purchases from top-selling to slow-selling articles, for instance at the end of seasons, to deplete the remaining stocks. This might be especially relevant for e-retailers who can easily guide the substitution process by targeted suggestions of promoted substitutes (Breugelmans

et al. 2006). Thus sales of dead articles can be enhanced. Online as well as offline tour operators can moreover use our findings to successfully exploit the allotments for their offered hotel assortment.

5.3 Limitations and future research

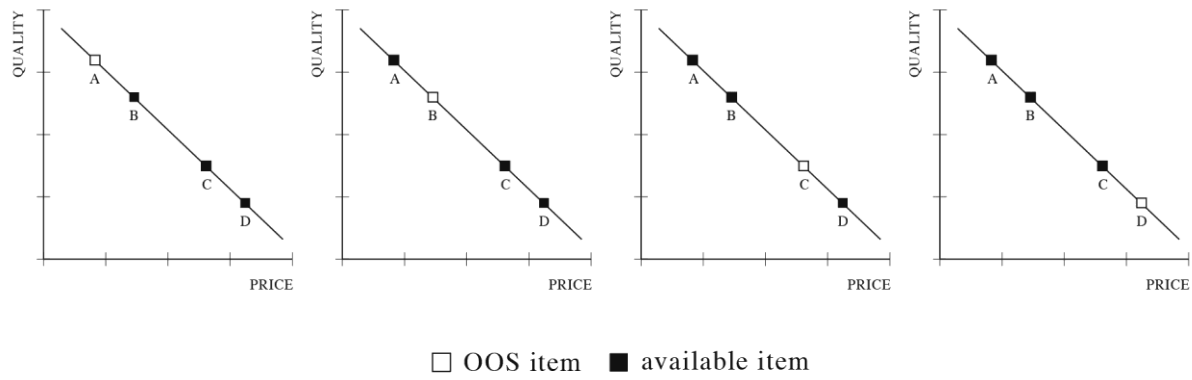
Despite the valuable contributions, our research is limited by several aspects which open avenues for further research. We test our hypotheses in four product categories and on the basis of reported behavior. This may decrease the external validity of our results as test persons might have had difficulties putting themselves into the fictitious OOS situation. Although this data collection method has several advantages (e.g., minimization of white noise) and has been applied by previous OOS and context studies, further research has to generalize the results by examining more categories and in a real-world shopping situation. This could be of particular interest in online shopping environments where demand is highly fluctuating (Rayport and Jaworski 2001) and stock-outs are ineluctable. As customers face smaller switching and information costs, they can be expected to exhibit different substitution patterns than in brick-and-mortar settings (Dadzie and Winston 2007). Moreover, our study only considers short-term OOS reactions. However, the assessment of permanent OOS-induced responses seems very interesting as damages to store and brand loyalty can only be recognized in the long-run and possibly after several OOS occasions. Since promotion proves to be an important driver of OOS responses, more research should be done to further analyze its influence. Finally, by combining research on context-dependent preferences and phantom alternatives, the study offers ample opportunities to further analyze prevailing context effects in situations of reduced choice set by varying the position of the unavailable product to test the potential effects on preference formation and choice decisions. Here, another interesting

direction to pursue would be the analysis of so-called N-phantoms (Gierl and Eleftheriadou 2005), which differ from the alternatives of the core choice set on a third dimension and might provoke distinct reaction and substitution patterns. One further issue worth investigating is how different reasons for the unavailability of the promoted product influence OOS reaction and the respective substitution behavior. Here, it would be imaginable to contrast OOS responses for stock-outs resulting from high and unforeseen demand with those that are the consequence of intended bait-and-switch techniques. Different psychological constructs like reactance (Brehm 1966) or an increase in attractiveness (Gea, Messinger, and Li 2009) could be used to further explain the findings.

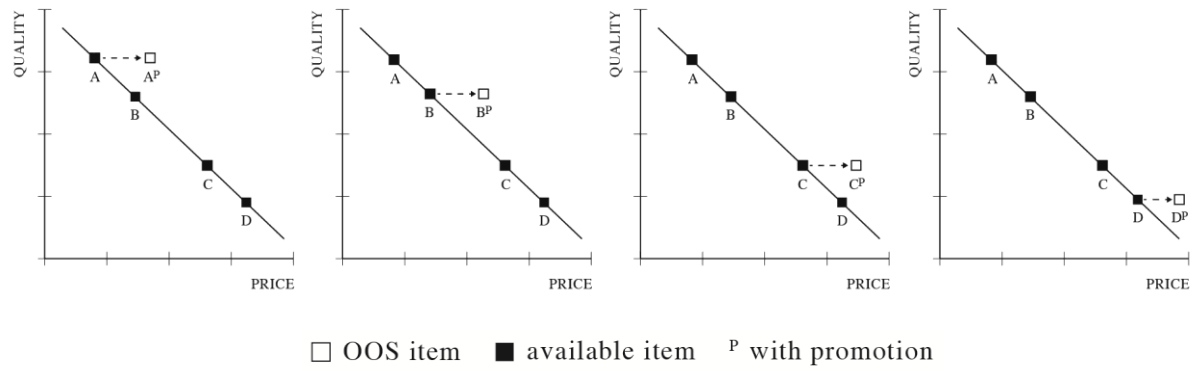
APPENDIX

APPENDIX A

PREFERENCE BRANDS AS PHANTOM ALTERNATIVES (STUDY 1)



APPENDIX A1 CONTROL GROUP



APPENDIX A2 EXPERIMENTAL GROUP

APPENDIX B

EXPECTED CHOICE SHARES UNDER THE LUCE MODEL

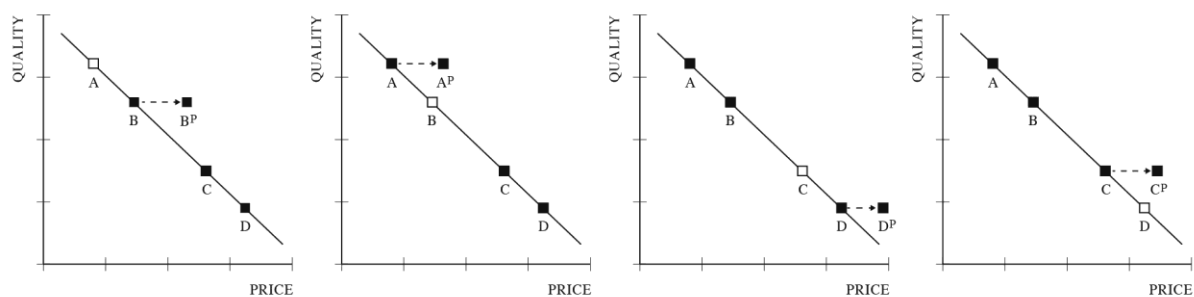
$$E_L(SS) = \frac{O_I(SS)}{\sum_{n=1}^2 O_I(DS_n)} \cdot O_I(P) + O_I(SS)$$

with

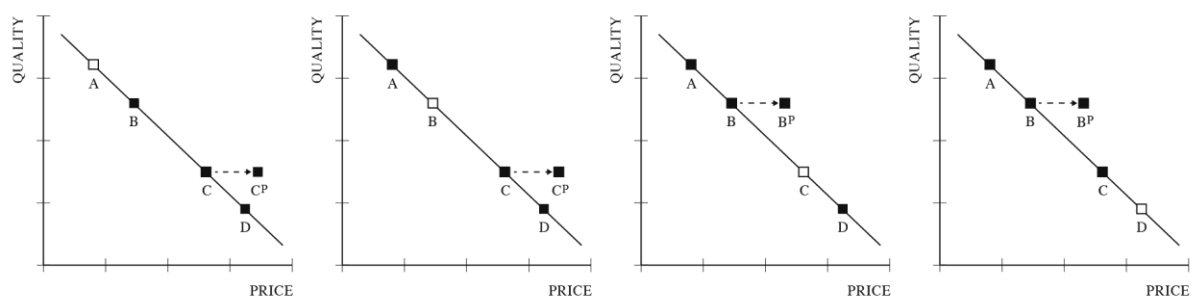
- $E_L(SS)$ - expected choice share of the similar substitute under the Luce Model in the second decision situation (P is out-of-stock),
- $O_I(SS)$ - observed choice share of the similar substitute in the first decision situation,
- $O_I(DS_n)$ - observed choice share of the dissimilar substitute n in the first decision situation, n=(1,2),
- $O_I(P)$ - observed choice share of the preference product in the first decision situation.

APPENDIX C

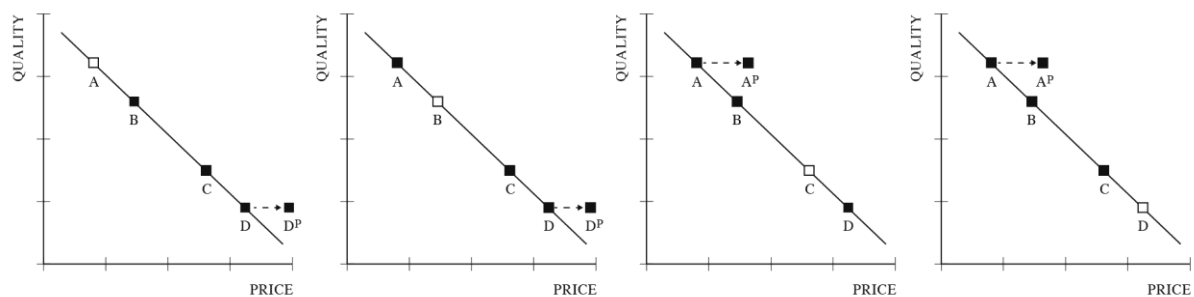
PROMOTION-INDUCED SHIFTS IN THE ATTRIBUTE SPACE (STUDY 2)



APPENDIX C1 SIMILAR SUBSTITUTE ON PROMOTION



APPENDIX C2 FAR SUBSTITUTE ON PROMOTION



APPENDIX C3 EXTREME SUBSTITUTE ON PROMOTION

REFERENCES

- Antil, John H. (1984), "Conceptualization and Operationalization of Involvement," in *Advances in Consumer Research*, Vol. 11, ed. Thomas C. Kinnear, Provo, UT: Association for Consumer Research, 203–09.
- Bellizzi, Joseph A., Harry F. Kruckeberg, John R. Hamilton, and Warren S. Martin (1981), "Consumer Perceptions of National, Private, and Generic Brands," *Journal of Retailing*, 57 (Winter), 56–70.
- Bettman, James R. (1979), *An Information Processing Theory of Consumer Choice*, Reading, MA: Addison-Wesley.
- Bhargava, Mukesh, John Kim, and Rajendra K. Srivastava (2000), "Explaining Context Effects on Choice Using a Model of Comparative Judgment," *Journal of Consumer Psychology*, 9 (3), 167–77.
- Blattberg, Robert C., Gary D. Eppen, and Joshua Lieberman (1981), "A Theoretical and Empirical Evaluation of Price Deals for Consumer Nondurables," *Journal of Marketing*, 45 (1), 116–29.
- Blattberg, Robert C. and Abel P. Jeuland (1981), "A Micro-Modeling Approach to Determine the Advertising Sales Relationship," *Management Science*, 27 (9), 988–1004.
- Brehm, Jack W. (1966), *A Theory of Psychological Reactance*, New York: Academic Press.
- Breugelmans, Els, Katia Campo, and Els Gijsbrechts (2006), "Opportunities for Active Stock-out Management in Online Stores: The Impact of the Stock-out Policy on Online Stock-out Reactions," *Journal of Retailing*, 82 (3), 215–28.
- Campo, Katia, Els Gijsbrechts, and Patricia Nisol (2000), "Towards Understanding Consumer Response to Stock-Outs," *Journal of Retailing*, 76 (2), 219–42.

- _____ (2003), "The Impact of Retailer Stockouts on Whether, How Much, and What to Buy," *International Journal of Research in Marketing*, 20 (3), 273–86.
- _____ (2004), "Dynamics in Consumer Response to Product Unavailability: Do Stock-out Reactions Signal Response to Permanent Assortment Reductions?" *Journal of Business Research*, 57 (8), 834–43.
- Cohen, Joel B. and Kunal Basu (1987), "Alternative Models of Categorization: Toward a Contingent Processing Framework," *Journal of Consumer Research*, 13 (4), 455–73.
- Dadzie, Kofi Q. and Evelyn Winston (2007), "Consumer Response to Stock-out in the Online Supply Chain," *International Journal of Physical Distribution & Logistics Management*, 37 (1), 19–42.
- Debreu, Gerard (1960), "Individual Choice Behavior: A Theoretical Analysis," *The American Economic Review*, 50 (1), 186–88.
- Dowling, Grahame R. and Richard Staelin (1994), "A Model of Perceived Risk and Intended Risk-Handling Activity," *Journal of Consumer Research*, 21 (1), 119–34.
- Doyle, John R., David J. O'Connor, Gareth M. Reynolds, and Paul A. Bottomley (1999), "The Robustness of the Asymmetrically Dominated Effect: Buying Frames, Phantom Alternatives, and In-Store Purchases," *Psychology and Marketing*, 16 (3), 225–43.
- ECR Europe and Roland Berger (2003), ECR – Optimal Shelf Availability – Increasing Shopper Satisfaction at the Moment of Truth.
- Emmelhainz, Margaret A., James R. Stock, and Larry W. Emmelhainz (1991), "Consumer Responses to Retail Stock-Outs," *Journal of Retailing*, 67 (2), 138–47.
- Farquhar, Peter H. and Anthony R. Pratkanis (1993), "Decision Structuring with Phantom Alternatives," *Management Science*, 39 (10), 1214–26.
- Fitzsimons, Gavan J. (2000), "Consumer Response to Stockouts," *Journal of Consumer Research*, 27 (2), 249–66.

- Fox, Edward J. and Stephen J. Hoch (2005), "Cherry-Picking," *Journal of Marketing*, 69 (1), 46–62.
- Gea, Xin, Paul R. Messinger, and Jin Li (2009), "Influence of Soldout Products on Consumer Choice," *Journal of Retailing*, 85 (9), 274–87.
- Gierl, Heribert and Christina Eleftheriadou (2005), "Asymmetrisch überlegene Stockouts als Phantomprodukte," *ZfbF - Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung*, 57 (9), 475–502.
- Gupta, Sunil (1988), "Impact of Sales Promotion on When, What, and How Much to Buy," *Journal of Marketing Research*, 25 (4), 342–55.
- Heath, Timothy B., Gangseog Ryu, Subimal Chatterjee, Michael S. McCarthy, David L. Mothersbaugh, Sandra Milberg, and Gary J. Gaeth (2000), "Asymmetric Competition in Choice and the Leveraging of Competitive Disadvantages," *Journal of Consumer Research*, 27 (3), 291–308.
- Hedgcock, William, Akshay R. Rao, and Haipeng A. Chen (2009), "Could Ralph Nader's Entrance and Exit Have Helped Al Gore? The Impact of Decoy Dynamics on Consumer Choice," *Journal of Marketing Research*, 46 (3), 330–43.
- Hegenbart, Thomas (2009), *Kundenverhalten bei Nichtverfügbarkeit von Artikeln im Einzelhandel – Einflussfaktoren, Konsequenzen und Implikationen*, Lohmar: JOSEF EUL VERLAG.
- Highhouse, Scott (1996), "Context-Dependent Selection: The Effects of Decoy and Phantom Job Candidates," *Organizational Behavior and Human Decision Processes*, 65 (1), 68–76.
- Houston, Michael J. and Michael L. Rothschild (1978), "A Paradigm for Research on Consumer Involvement," unpublished working paper No. 11-77-46, Graduate School of Business, University of Wisconsin, Madison.

- Hoyer, Wayne D. (1984), "An Examination of Consumer Decision Making for a Common Repeat Purchase Product," *Journal of Consumer Research*, 11 (3), 822–29.
- Huber, Joel, John W. Payne, and Christopher Puto (1982), "Adding Asymmetrically Dominated Alternatives: Violations of Regularity and the Similarity Hypothesis," *Journal of Consumer Research*, 9 (1), 90–98.
- Huber, Joel and Christopher Puto (1983), "Market Boundaries and Product Choice: Illustrating Attraction and Substitution Effects," *Journal of Consumer Research*, 10 (1), 31–44.
- Kahneman, Daniel and Amos Tversky (1979), "Prospect Theory: An Analysis of Decision under Risk," *Econometrica*, 47 (2), 263–92.
- Karakaya, Fahri (2000), "Market Exit and Barriers to Exit: Theory and Practice," *Psychology and Marketing*, 17 (8), 651–68.
- Luce, R. Duncan (1959), *Individual Choice Behavior – A Theoretical Analysis*, New York: John Wiley and Sons.
- McFadden, Daniel (1980), "Econometric Models for Probabilistic Choice Among Products," *The Journal of Business*, 53 (3), 13–29.
- Parducci, Allen (1965), "Category Judgment: A Range-Frequency Model," *Psychological Review*, 72 (6), 407–18.
- Payne, John W., James R. Bettman, and Eric J. Johnson (1992), "Behavioral Decision Research: A Constructive Processing Perspective," *Annual Review of Psychology*, 43 (1), 87–131.
- Peckham, James. O. (1963), "The consumer speaks," *Journal of Marketing*, 27 (4), 21–26.
- Pettibone, Jonathan C. and Douglas H. Wedell (2000), "Examining Models of Nondominated Decoy Effects across Judgment and Choice," *Organizational Behavior and Human Decision Processes*, 81 (2), 300–28.

- _____ (2007), "Testing Alternative Explanations of Phantom Decoy Effects," *Journal of Behavioral Decision Making*, 20, 323–41.
- Pratkanis, Anthony R. and Peter H. Farquhar (1992), "A brief history of research on phantom alternatives: Evidence for seven empirical generalizations about phantoms," *Basic and Applied Social Psychology*, 13 (1), 103–22.
- Rayport, Jeffrey F. and Bernard J. Jaworski (2001), *e-Commerce*, New York, NY: McGraw-Hill/Irwin Marketspace.
- Richardson, Paul S., Alan S. Dick, and Arun K. Jain (1994), "Extrinsic and Intrinsic Cue Effects on Perceptions of Store Brand Quality," *Journal of Marketing*, 58 (4), 28–36.
- Scarpi, Daniele (2008), "The impact of decoys and background information on consumers' preferences and decision making," *The International Review of Retail, Distribution and Consumer Research*, 18 (1), 1–15.
- Sheng, Shibin, Andrew M. Parker, and Kent Nakamoto (2005), "Understanding the Mechanism and Determinants of Compromise Effects," *Psychology and Marketing*, 22 (7), 591–609.
- Shugan, Steven M. (1980), "The Cost of Thinking," *Journal of Consumer Research*, 7 (2), 99–111.
- Simonson, Itamar (1989), "Choice based on Reasons: The Case of Attraction and Compromise Effects," *Journal of Consumer Research*, 16 (2), 158–74.
- Sloot, Laurens M., Peter C. Verhoef, and Philip H. Franses (2005), "The Impact of Brand Equity and the Hedonic Level of Products on Consumer Stock-out Reactions," *Journal of Retailing*, 81 (1), 15–34.
- Tversky, Amos (1972), "Elimination by Aspects: A Theory of Choice," *Psychological Review*, 79 (4), 281–99.
- _____ (1977), "Features of similarity," *Psychological Review*, 84 (4), 327–52.

- Tversky, Amos and Daniel Kahneman (1991), "Loss Aversion in Riskless Choice: A Reference-Dependent Model," *The Quarterly Journal of Economics*, 106 (4), 1039–61.
- Tversky, Amos, Shmuel Sattath, and Paul Slovic (1988), "Contingent Weighting in Judgment and Choice," *Psychological Review*, 95 (3), 371-84.
- Tversky, Amos and Itamar Simonson (1993), "Context-Dependent Preferences," *Management Science*, 39 (10), 1179–89.
- van Heerde, Harald J., Sachin Gupta, and Dick R. Wittink (2003), "Is 75% of the Sales Promotion Bump Due to Brand Switching? No, Only 33% Is," *Journal of Marketing Research*, 40 (4), 481–91.
- Verbeke, Willem, Paul Farris, and Roy Thurik (1998), "Consumer Response to the Preferred Brand Out-of-stock Situation," *European Journal of Marketing*, 32 (11/12), 1008–28.
- Wiebach, Nicole and Lutz Hildebrandt (2011), "Explaining Customers' Switching Patterns to Brand Delisting," *Journal of Retailing and Consumer Services*, forthcoming.
- Zinn, Walter and Peter C. Liu (2001), "Consumer Response to Retail Stockouts," *Journal of Business Logistics*, 22 (1), 49–71.

TABLES

TABLE 1

INITIAL CHOICE SETS

	Experiment 1 Detergent (n = 451)		Experiment 2 Orange juice (n = 793)		Experiment 3 Restaurant (n = 878)		Experiment 4 Hotel (n = 1210)	
	<i>Price^a</i>	<i>Quality^b</i>	<i>Price^c</i>	<i>Quality^d</i>	<i>Price^e</i>	<i>Quality^f</i>	<i>Price^g</i>	<i>Quality^h</i>
Brand A	6.69€	90	1.28€	80	24€	8	120€	8
Brand B	5.99€	80	1.12€	70	21€	7	105€	7
Brand C	3.49€	50	0.80€	50	12€	4	60€	4
Brand D	2.85€	40	0.64€	40	9€	3	45€	3

^a Price for 18 loads, ^c price per liter, ^e price per meal including one drink, ^g price per night, including breakfast

^b Quality was operationalized by quality points awarded by a product test foundation with regard to cleaning power, color protection and ecological ingredients (100-highest quality, 0-lowest quality).

^d Quality was operationalized by quality points awarded by a product test foundation with regard to flavor, fruit juice content, sugar content, no harmful substances (100-highest quality, 0- lowest quality).

^f Quality Ranking (10-highest quality, 0- lowest quality).

^h Quality was operationalized by quality points awarded by an evaluation portal with regard to cleanliness, location and surrounding area, facilities, service and staff (10-highest quality, 0- lowest quality).

TABLE 2**INITIAL CHOICE (PREFERENCE PRODUCT, STUDY 1)**

Experiment	Group	n	Brand A nominal (ratio)	Brand B nominal (ratio)	Brand C nominal (ratio)	Brand D nominal (ratio)
Experiment 1 (detergent)	Control Group	224	18.3% (22.86)	36.6% (34.09)	37.9% (30.33)	7.1% (12.71)
	Experimental Group	227	15.0% (20.61)	40.5% (35.50)	36.1% (31.81)	8.4% (12.08)
Experiment 2 (orange juice)	Control Group	336	52.4% (47.13)	33.6% (30.05)	10.7% (15.40)	3.3% (7.43)
	Experimental Group	457	49.5% (45.26)	33.5% (32.14)	13.3% (15.15)	3.7% (7.45)
Experiment 3 (restaurant)	Control Group	455	13.2% (18.44)	40.0% (36.29)	39.8% (33.00)	7.0% (12.26)
	Experimental Group	423	12.8% (17.67)	43.5% (34.92)	36.6% (34.72)	7.1% (12.69)
Experiment 4 (hotel)	Control Group	461	4.8% (9.41)	22.8% (23.35)	41.6% (35.51)	30.8% (31.73)
	Experimental Group	749	5.2% (9.31)	28.3% (27.03)	37.1% (34.32)	29.4% (29.33)

TABLE 3**OBSERVED VERSUS EXPECTED CHOICE SHARES**

	Experiment 1 (detergent)			Experiment 2 (orange juice)			Experiment 3 (restaurant)			Experiment 4 (hotel)		
	Whole Sample	Contr. Group	Exp. Group	Whole Sample	Contr. Group	Exp. Group	Whole Sample	Contr. Group	Exp. Group	Whole Sample	Contr. Group	Exp. Group
$M_{O(SS)}$	54.09	57.67	50.55	73.83	74.63	73.25	58.63	58.91	58.33	64.16	63.39	64.62
$M_{E_L(SS)}$	45.43	46.58	44.29	58.29	55.77	60.15	49.26	48.51	50.07	52.22	52.42	52.11
$NSE_{(SS)}$	8.66¹	11.09	6.26	15.54	18.86	13.10	9.37	10.40	8.26	11.94	10.97	12.51
	$t = 7.040,$ $df = 450,$ $p < .01$	$F = 3.879,$ $df = 1,$ $p < .05$	$t = 14.923,$ $df = 792,$ $p < .01$	$F = 7.563,$ $df = 1,$ $p < .01$	$t = 9.546,$ $df = 877,$ $p < .01$		n.s.			$t = 13.614,$ $df = 1209,$ $p < .01$	n.s.	

¹ figures in bold indicate that the effect is significant at $p < .01$ and in the expected direction

TABLE 4**INITIAL CHOICE (PREFERENCE PRODUCT, STUDY 2)**

Experiment	Group	n	Brand A nominal (ratio)	Brand B nominal (ratio)	Brand C nominal (ratio)	Brand D nominal (ratio)
Experiment 5 (detergent)	SS	438	13.7% (19.70)	37.2% (32.88)	40.0% (32.05)	9.1% (15.37)
	FS	260	11.5% (18.21)	37.3% (34.17)	39.2% (31.98)	11.9% (15.63)
	ES	262	15.3% (22.47)	37.0% (32.20)	38.5% (30.66)	9.2% (14.67)
Experiment 6 (hotel)	SS	235	3.8% (11.88)	31.9% (29.71)	40.0% (32.55)	24.3% (25.85)
	FS	230	3.5% (11.26)	36.1% (29.58)	34.3% (31.68)	26.1% (27.47)
	ES	190	7.4% (15.57)	30.5% (28.09)	33.7% (28.78)	28.4% (27.55)

TABLE 5

OBSERVED VERSUS EXPECTED CHOICE SHARES
(SS, FS AND ES WITH ROTATING PROMOTION PRODUCT)

		Experiment 1 (detergent)				Experiment 2 (hotels)			
		Whole sample	SS ^a	FS ^b	ES ^c	Whole sample	SS ^a	FS ^b	ES ^c
$M_{O(SS)}$		56.59	69.86	40.34	50.55	61.63	73.07	52.75	58.24
$M_{E_L(SS)}$		44.45	44.33	42.68	46.41	52.29	50.41	50.97	56.23
$NSE_{(SS)}$	$O(SS) - E_L(SS)$	12.14¹	25.53	-2.34 ^{ns}	4.14	9.34	22.66	1.78 ^{ns}	2.01 ^{ns}
		$t = 11.543,$ $df = 959,$ $p < .01$	$t = 17.653,$ $df = 437,$ $p < .01$	$t = -1.222,$ $df = 259,$ $p > .10$	$t = 2.296,$ $df = 261,$ $p < .05$	$t = 8.578,$ $df = 654,$ $p < .01$	$t = 12.353,$ $df = 234,$ $p < .01$	$t = 1.056,$ $df = 229,$ $p > .10$	$t = 1.157,$ $df = 189,$ $p > .10$
$M_{O(FS)}$		31.51	23.00	53.48	23.91	28.52	21.20	40.97	22.52
$M_{E_L(FS)}$		38.54	38.25	42.69	34.91	35.18	36.56	36.66	31.69
$AE_{(FS)}$	$O(FS) - E_L(FS)$	-7.03	-15.25	10.79	-11.00	-6.66	-15.36	4.31	-9.17
		$t = -7.517,$ $df = 959,$ $p < .01$	$t = -12.492,$ $df = 437,$ $p < .01$	$t = 5.663,$ $df = 259,$ $p < .01$	$t = -7.172,$ $df = 261,$ $p < .01$	$t = -6.843,$ $df = 654,$ $p < .01$	$t = -10.146,$ $df = 234,$ $p < .01$	$t = 2.826,$ $df = 229,$ $p < .01$	$t = -5.224,$ $df = 189,$ $p < .01$
$M_{O(ES)}$		11.80	6.92	6.17	25.54	9.85	5.74	6.29	19.24
$M_{E_L(ES)}$		17.01	17.42	14.62	18.68	12.52	13.04	12.37	12.08
$AE_{(ES)}$	$O(ES) - E_L(ES)$	-5.21	-10.50	-8.45	6.86	-2.67	-7.30	-6.08	7.16
		$t = -7.447,$ $df = 959,$ $p < .01$	$t = -13.106,$ $df = 437,$ $p < .01$	$t = -7.917,$ $df = 259,$ $p < .01$	$t = 4.041,$ $df = 261,$ $p < .01$	$t = -3.747,$ $df = 654,$ $p < .01$	$t = -7.504,$ $df = 234,$ $p < .01$	$t = -6.944,$ $df = 229,$ $p < .01$	$t = 4.292,$ $df = 189,$ $p < .01$

^a Similar substitute (SS) on promotion

^b Far substitute (FS) on promotion

^c Extreme substitute (ES) on promotion

^{ns} not significant

¹ figures in bold indicate that the effect is significant at $p < .01$ and in the expected direction

FIGURES

FIGURE 1

SIMILARITY EFFECT, ATTRACTION EFFECT AND COMPROMISE EFFECT

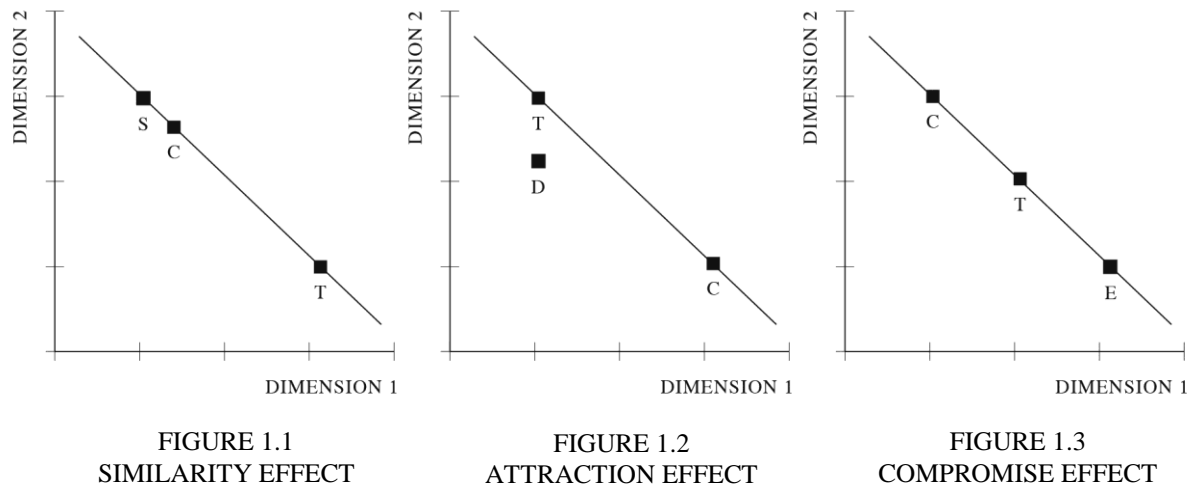


FIGURE 2

NEGATIVE SIMILARITY EFFECT, ASYMMETRICALLY DOMINATING AND
RELATIVELY SUPERIOR PHANTOM

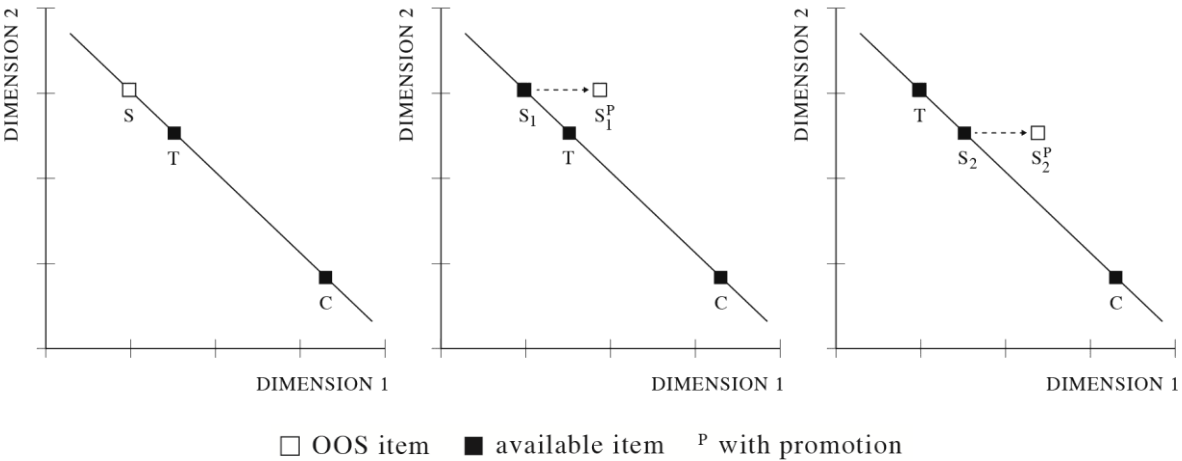


FIGURE 2.1 NEGATIVE
SIMILARITY EFFECT

FIGURE 2.2 ASYMMETRICALLY
DOMINATING PHANTOM

FIGURE 2.3 RELATIVELY
SUPERIOR PHANTOM

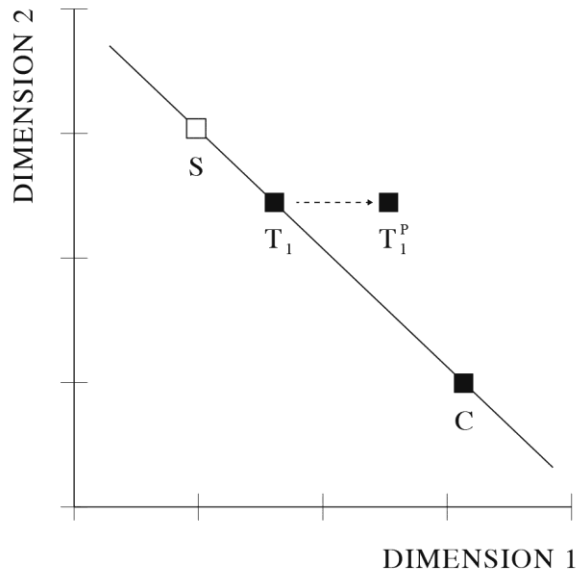
FIGURE 3**ASYMMETRICALLY DOMINATED AND RELATIVELY INFERIOR PHANTOM**

FIGURE 3.1
RELATIVELY INFERIOR PHANTOM

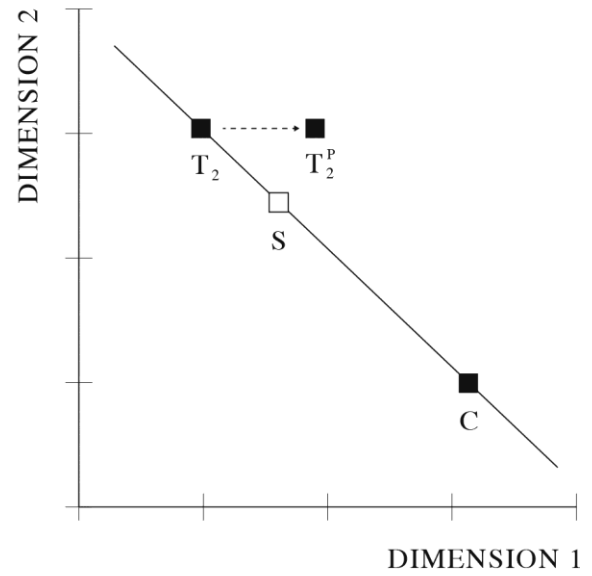


FIGURE 3.2
ASYMMETRICALLY DOMINATED PHANTOM

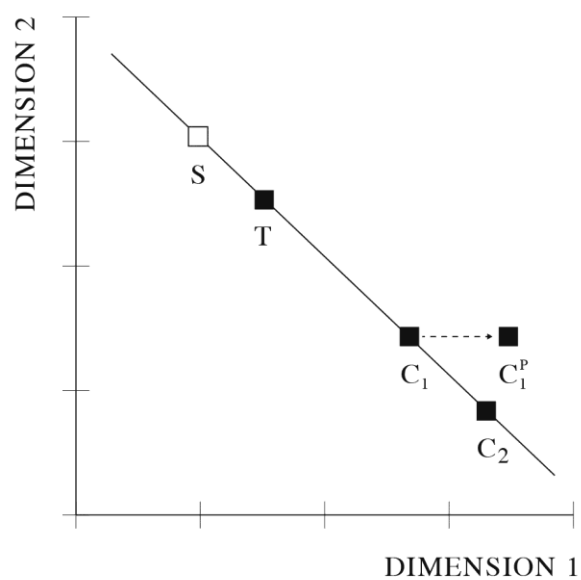
FIGURE 4**ASYMMETRICALLY DOMINATED AND RELATIVELY INFERIOR DECOY**

FIGURE 4.1
ASYMMETRICALLY DOMINATED DECOY

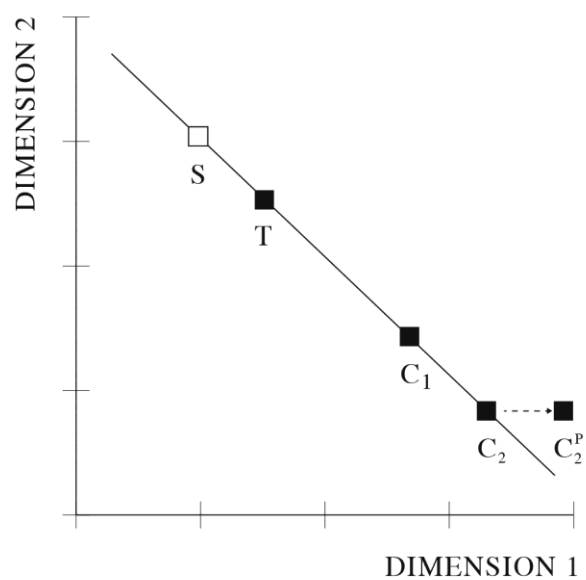
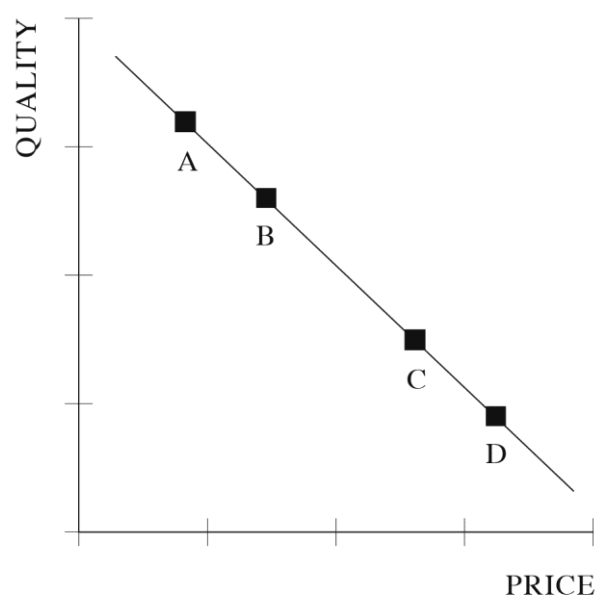


FIGURE 4.2
RELATIVELY INFERIOR DECOY

FIGURE 5

INITIAL ATTRIBUTE SPACE



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